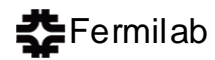


## Recycler BPM Calibration Application

- Current Status
- Data so far
- Where we go from here

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Notes:

## Current Status

- Prototype application at R57
  - controls signal generator
  - collects closed orbit data
- Has successfully been used at MI50
- Currently outputs
  - graphs
  - spreadsheet data

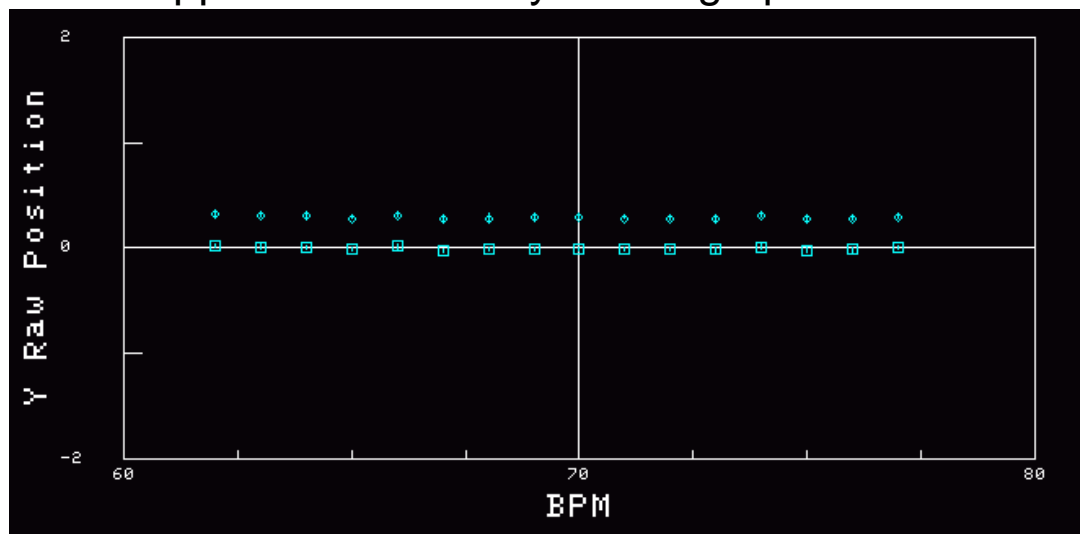
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Notes:

## Outputs: Graphs

The application currently draws graphs like:



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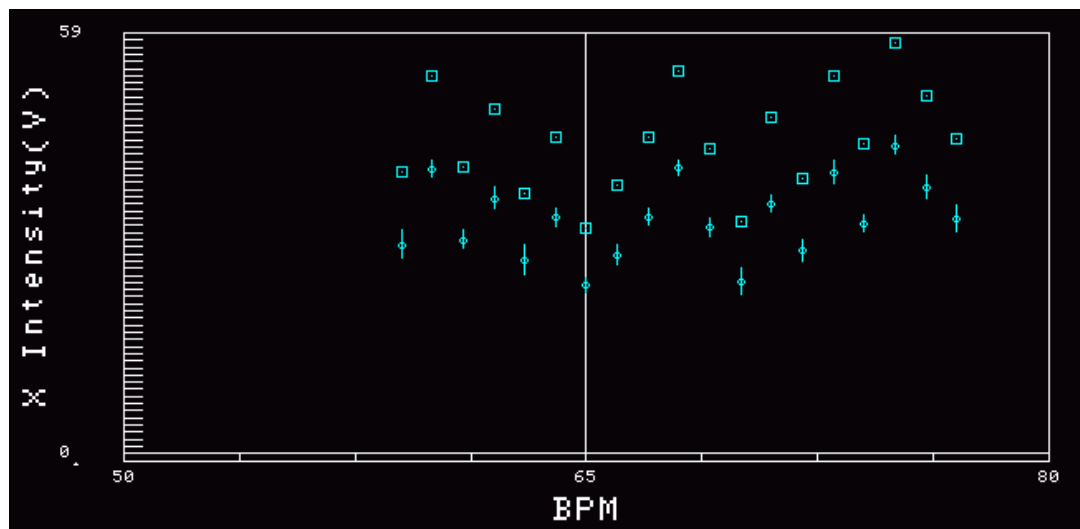


Notes:

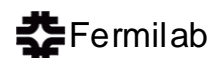
- average unscaled position for two passes is plotted
- boxes show  $A=B$
- diamonds show  $0.5*A = B$
- vertical lines show scaled RMS error
- individual problem BPMs easy to spot:
  - reversed channels (diamond on wrong side)
  - shorted channel (diamond too near center)
  - high noise (wide error bar)

## Outputs: Graphs

And like:



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Notes:

- average unscaled position for two passes is plotted
- boxes show  $A=B$
- diamonds show  $0.5*A = B$
- vertical lines show scaled RMS error
- shows variance in recieved signal at different BPMS from calibration signal

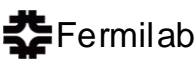
# Output: Spreadsheets

We can also get spreadsheet data (As .csv files)

The screenshot shows a spreadsheet application window. The menu bar includes File, Edit, View, Insert, Format, Tools, Data, and Help. The toolbar contains various icons for file operations, editing, and data manipulation. The spreadsheet grid has columns labeled A through H and rows numbered 1 through 10. The cell A2 is selected and contains the text 'High'. The formula bar above the grid shows '= "High"'. The data in the spreadsheet is as follows:

	A	B	C	D	E	F	G	H
1								
2	High							
3								
4	Machine	Date	Horz BPM	Reading 1	Raw	RMS	Intensity	Reading 2
5	RECYCLEI	20-AUG-20	R:HP412	0.00	0.00	0.00	0.00	0.00
6			R:HP414	0.00	-0.01	0.00	40.19	0.12
7			R:HP416	0.00	0.02	0.00	53.66	-2.06
8			R:HP418	0.00	0.01	0.00	40.56	-1.07
9			R:HP420	0.00	-0.03	0.00	48.74	0.92
10			R:HP422	0.00	-0.00	0.00	36.91	-1.15

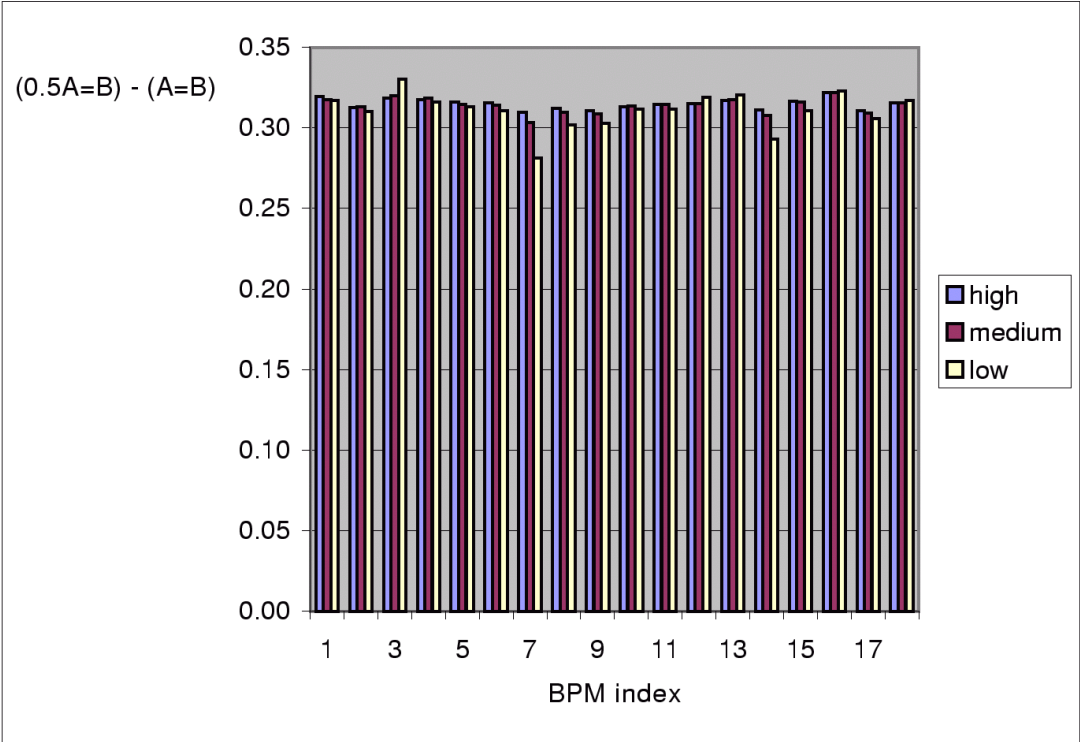
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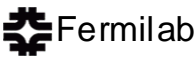
Notes:

# Output: Spreadsheets

This has let Stephen do stuff like:



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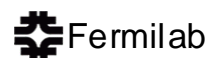


Notes:

## Data so far

- Spreadsheet data has been most interesting; allows comparing intensities
- electrical offset may be intensity sensitive (perhaps need a  $(kA-B)/(kA+B)$  correction?)
- Application cannot set calibration constants need electrical vs physical separation

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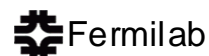
Notes:

## Where we go from here

### Update of Application

- Run all 3 intensities
- Log results in database
- Save results in spreadsheet
- Display all BPMs at one time
- Display single BPM over time
- Better graph labelling

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Notes: Notes on slide.